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The Genus Achillea in North America *

By Charles Louis Pollard.

This genus, as now generally understood, consists of from eighty to one hundred species, confined almost entirely to the temperate regions of the Old World. Its critical study has been neglected by American botanists, owing probably to the fact that its representation on this continent was believed to be restricted to two or three species, even these being supposedly introduced from abroad.

The Tournefortian genus *Ptarmica*, which was accepted by De Candolle in the Prodromus, has usually been regarded as scarcely more than a subgenus of *Achillea*. The heads of both are radiate as well as discoid, and in both the achenes are more or less margined. The chief points of distinction lie in the shape of the involucre and the degree of convexity which the receptacle exhibits, while there are few or no habital differences. In this paper, therefore, *Achillea* is accepted as outlined by Hoffman in "Die natürlichen Pflanzenfamilien."

It is an odd coincidence that the type species of both *Ptarmica* and *Euachillea* should occur in North America. *A. Ptarmica* L. is introduced in various portions of the northeastern states, and also in Newfoundland and British Columbia. *A. Millefolium* L., the familiar yarrow, occurs likewise as an introduced weed in meadows, pastures, etc., throughout the Atlantic states from Nova Scotia to Florida, and westward to the Rocky Mountains; it is also occasionally found on the Pacific coast. The fact, however, that the yarrow, of one form or another, extends not only through the West, but northward as well through British Columbia and Alaska, and southward into Mexico, has induced most botanists of the present century to consider the plant a circumpolar type with a well-nigh world-wide distribution. Yet from the earliest pilgrimages of western pioneers, long before the region was penetrated by railroads, *Achillea* has been equally as abundant, and equally at home under conditions that absolutely preclude the assumption that it is not indigenous.* The theory of range-extension explains this circumstance, but fails to take cognizance of the manifest differences of structure existing between eastern and western individuals, and again between western and northern types—differences too marked to find explanations in ordinary circumstances. Moreover, very few modern taxonomists would admit that a single species can occur unchanged throughout so vast a territory as Europe, northern Asia and North America, under such varied conditions of soil, temperature and environment.

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The extensive travels of Nuttall convinced that keen-eyed botanist that the yarrow of the western plateau was not only indigenous, but specifically distinct from the eastern *A. Millefolium*. He therefore published it as *A. lanulosa*, a name which was soon thereafter relegated to synonymy by Hooker. Pursh had previously identified as *A. tomentosa* of Willdenow a plant collected by Lewis in Oregon, the rays of which were stated to be yellow. Nuttall cites *tomentosa* as a synonym, the fact being that Willdenow's name was applied originally by Linnaeus to a species or south Europe known to possess yellow rays. Pursh's error can accordingly be accounted for on the basis of transposed or mistaken labels, scarcely, as Dr. Gray suggested, because the rays of his specimen turned yellow in drying, a phenomenon which, as Professor Greene has remarked to me, never occurs in this genus.

The yarrow found abundantly in Alaska and northern British Columbia was described by Bongard as *A. borealis*, a name which promptly met the same fate as *lanulosa* in Hooker's Flora Boreali-Americana. The species extends southward to the Cascades and Sierras, penetrating even into Mexico, but it is doubtful if it occurs below an altitude of 8000 feet in the southern half of its range. Another species, growing also at high elevations, is found in Mexico. California furnishes two new species, one of the coast, distinguished by its peculiar foliage, which is harsh and scabous, one from the San Joaquin valley, remarkable for its large stature, branching habit, and small rays. These latter forms are manifestly members of the subgenus *Euachillea*, and therefore might logically be reduced to the aggregate *A. Millefolium* by botanists of conservative tendencies; but it is difficult to comprehend why *A. borealis*, which belongs to *Ptarmica* and was placed there by De Candolle should have been transferred to the other division of the genus and combined with the type species thereof.

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* Mr. Coville, in discussing the use made of the yarrow by the Klamath Indians of Oregon, remarks that it is "from the evidence of its occurrence even in very remote and unsettled parts of the plains and from the statements of the Indians, unquestionably native in our Northwest." (Contr. U. S. Nat. Herb. 5: 105. 1897.)

The great mass of our American yarrows may be regarded as belonging to two species. Those of the East seem to be referable to the true European *A. Millefolium*, having the same inflorescence, the same rather diminutive rays and much dissected glabrate foliage. In the Rocky Mountain region there is apparently a commingling and an intergradation with *A. lanulosa*, which although extremely polymorphous, is usually distinguished by its much larger rays and more or less lanate pubescence. I have made a careful dissection of the heads of thirty specimens from widely separated localities in the West, and while there are often differences in the involucral bracts, the measurement of the rays and the appearance of the foliage, these differences cannot be correlated. I am therefore convinced that in the present state of our knowledge it is better to leave the species as an aggregate which we may perhaps regard as already in a process of differentiation. Future collections and observations, particularly with respect to altitudinal distribution, will undoubtedly enable us to make a more satisfactory disposal of these forms.

Specimens of *Achillea* having pink or even rose-red rays are not uncommon, particularly east of the Mississippi. One of these was described by Ventenat, under the name of *A. asplenifolia*, from a garden-grown individual, the seeds of which were brought from Carolina by Bosc; but De Candolle observes that the plant had been well known in European gardens long before Bosc's time. My first impression was that Ventenat's description applied only to the ordinary pink-rayed form of *A. Millefolium*; but having examined his illustration in connection with some very interesting herbarium material, I am now convinced that *A. asplenifolia* is a cultivated plant only, the origin of which is uncertain. The shape and position of the leaf-segments is entirely different from any form of *Millefolium*, and the only specimens matching figure and description that have come within my observation were from cultivated individuals. All wild yarrows with red or pink rays will be found to agree perfectly with the white-flowered forms, and are found growing under similiar conditions, so that they are scarcely worthy of even varietal rank.

I append a key to the species discussed in detail below.

Involucre campanulate, its bracts fuscous-margined ; receptacle nearly flat; ray-flowers usually numerous (10–20) ; achenes rather broadly wing-margined. PTARMICA.
  Leaves bipinnate. 1. *A. borealis.*
  Leaves simple or pinnatifid.
    Corymbs loosely few-flowered ; rays exceeding the bracts. 2. *A. Ptarmica.*
    Corymbs densely many-flowered ; rays shorter than the bracts. 3. *A. multiflora.*
Involucre oblong, the bracts scarcely fuscous-margined ; receptacle convex ; ray-flowers few (5–10) ; achenes narrowly margined. EUACHILLEA.
  Rays usually more than 4 mm. in diameter.
    Leaves with finely divided crowded segments. 4. *A. lanulosa.*
    Leaves with coarser, distinct segments.
      Rays white. 5. *A. Californica.*
      Rays red. 6. *A. asplenifolia.*
  Rays less than 4 mm. in diameter.
    Plant very tall and branching. 7. *A. gigantea.*
    Plant simple or slightly branched at summit.
      Ultimate leaf-divisions filiform. 8. *A. Pecten-Veneris.*
      Ultimate leaf-divisions linear.
        Corymbs dense. 9. *A. Millefolium.*
        Corymbs loose. 10. *A. ligustica.*

1. ACHILLEA BOREALIS BONG. Veg. Ins. Sitch. 149. 1831.

Plant very variable in size, rarely exceeding 4 dm. in height; stem and leaves usually more or less lanate, the latter bipinnate with numerous crowded segments, the ultimate divisions minute and acicular: corymb densely circinate, the heads 4–8 mm. in height with large white or pink rays 5 mm. in diameter: involucral bracts somewhat scarious, with a conspicuous dark fuscous margin: achenes slender, prominently winged.

From Labrador and northern British Columbia to Alaska and adjacent Siberia, southward in the higher mountain ranges of the Pacific slope to Central Mexico. Easily distinguished by its remarkably handsome heads. The lower leaves are sometimes of very large proportions, similar to those of *A. Californica.*

2. A. PTARMICA L. Sp. Pl. 898. 1753.

From Newfoundland and Canada to New England, and Michigan.

3. A. MULTIFLORA Hook. Fl. Bor. Am. **1**: 318. 1834.

Northern British Columbia.

These two species have been generally recognized in our floras. They are well characterized by the simple or merely pinnatifid leaves.

4. ACHILLEA LANULOSA Nutt. Journ. Acad. Nat. Sci. Phila. (1834), 7: 36. 1834.

A. tomentosa Pursh, Fl. Am. Sept. **2**: 563. 1814. Not L.

A. setacea Schwein. in Long's 2d Exp. **2**: 119. 1823. Not Waldst. & Kit.

A. Millefolium γ occidentale DC. Prodr. 6: 24. 1837.

Plant varying greatly in stature, usually from 3–5 dm. high, the whole surface densely lunate, or sometimes nearly glabrate: leaves all finely bipinnatifid, the segments closely approximate, the ultimate divisions minute and acicular, sometimes even spinulose: corymb usually circinate, in age becoming flat-topped: involucral bracts stramineous with greenish keels and brown apical margins: rays usually large (4–6 mm.): achenes elliptical, rather broadly margined.

From British Columbia to the Mexican boundary, eastward to South Dakota, Nebraska and Kansas; possibly also introduced as a ballast weed in the East. An immensely variable species of the plains, growing naturally under a great variety of conditions and in various situations. I have already referred to the difficulty attending any satisfactory disposal of this type. There is less need of additional material than of carefully tabulated field notes giving full altitudinal and climatic data.

5. **Achillea Californica** sp. nov.

Plant robust, inclined to branch at the summit, 6–8 dm. or more high: stem somewhat sulcate, villous with long appressed hairs: leaves very numerous, 6–10 cm. in length, or the basal even exceeding these figures, all bipinnatifid with coarse, rather crowded segments, general outline linear-lanceolate, the pinnae scarcely reduced toward the sessile base; surface of the foliage glabrate, the tips of the ultimate segments harsh and spinulose: corymb very compound, inclined to be flat-topped, the branchlets pubescent: heads 5–6 mm. in height, the involucral bracts stramineous, with greenish keels and slightly fuscous margins; rays large and conspicuous (3–5 mm.): achenes linear narrowly margined.

Type in the U. S. National Herbarium (no. 238094) collected by Mr. H. W. Henshaw on the Californian sea coast at Santa Ysabel, May, 1893. The same plant is found at other points on the coast line, notably at Santa Barbara. In many respects this species exhibits the characters of a true halophyte.

6. ACHILLEA ASPLENIFOLIA Vent. Hort. Cels. *t. 95.* 1800

A. rosea Desf. Tabl. Hort. Par. ed. **1** : 105. 1804.

Stem villous, usually simple : leaves glabrate, regularly bipinnate or even tripinnatifid, the rachis slightly margined : segments divaricately spreading, their divisions more or less lobed, linear and acute : petiole with dilated margined base, the pinnae little reduced below : corymb dense : involucral scales very sparsely hairy, with green centers and scarious, ciliate margins, often somewhat rufous at apex : rays 2–4 mm. in diameter, rose-purple : achenes linear, very slightly winged.

Occurring only in cultivation, the original habitat unknown.

There are two specimens of this remarkable species in the National Herbarium ; one collected at the Botanical Garden by Schott, and one obtained from a garden at Oneida, N. Y., by Mr. William R. Maxon. I have also noted a plant in the Harvard Herbarium, collected by Sartwell at Penn Yan, N. Y., which, although the label does not indicate it, was doubtless from a cultivated individual. It is frequent in European gardens, thus giving color to the supposition that it originated as a horticultural variety ; at present, however, it is abundantly distinct from any rose-rayed form of the wild yarrow.

7. **Achillea gigantea** sp. nov.

Plant robust and much branched, nearly 1 m. in height. the main stem 1 cm. in diameter, sulcate and densely clothed like the foliage, with long villous hairs ; leaves on the main stem 8–10 cm. long, those on the branches 4 cm. long, linear lanceolate in outline, biipnnatifid with coarse closely approximate pinnae, these scarcely at all reduced toward the sessile, almost auricled base : ultimate segments from linear to ovate, usually obtuse : corymb many-branched, long-stalked, circinate, the branchlets densely pubescent : heads 5–6 mm. in height, the involucral bracts carinate, greenish throughout : rays very small, scarcely exceeding 1 mm : achene elliptical, obscurely winged : style but little exserted.

Type in the U. S. National Herbarium (no. 279104) collected by Dr. Edward Palmer near Tulare Lake, Tulare Co., California, August, 1892. The specimen includes a portion of the main stem with two side branches, and the dimensions given above are those of the entire plant as nearly as Dr. Palmer recollects them. I have observed no other specimen of this remarkable *Achillea*.

8. **Achillea Pecten-Veneris** sp. nov.

Plant of slender habit, 4 dm. or more in height, simple, the stem markedly sulcate, loosely pubescent or villous; leaves 8–12 cm. in length, oblanceolate in general outline, regularly and finely bipinnatifid or bipinnate, the segments as well as the ultimate divisions filiform, gradually reduced toward the base of the rachis; surface of the foliage obscurely pubescent with scattered hairs, the somewhat clasping base of the petiole usually villous: corymb many-branched, inclined to be flat-topped, the branches and branchlets puberulent: heads 4–5 mm. in height, the bracts of the involucre stramineous, carinate, each with a dorsal greenish stripe: rays white, scarcely exceeding 2 mm. in length: achenes narrowly elliptical, rather more broadly margined than in other members of the subgenus: style much exserted.

Type in the herbarium of Harvard University, collected by A. Duges at Guanajuato, Mexico (no. 421). Mr. Seaton's no. 354, in the Herbarium of Columbia University, collected on Mt. Orizaba at an altitude of 8000 feet, is also to be referred here.*

9. ACHILLEA MILLEFOLIUM L. Sp. Pl. 899. 1753.

Plant of variable stature, usually 3–6 dm. high, sparsely villous or glabrate; leaves of thin texture, evenly bipinnatifid, the petiole with dilated clasping base; segments not closely approximated, the ultimate divisions linear: corymb generally flat-topped, very compound, the branchlets glabrate: involucral bracts pale stramineous with greenish keels: rays usually small (2–3 mm.), white or pink: achenes linear, scarcely margined.

Newfoundland and Canada to Florida, westward to the foothills of the Rocky Mountains. Specimens selected at random from various parts of this range were found to agree perfectly with European material. It should be noted here that although Linnaeus cites no figure for his type, there are numerous illustrations of *A. Millefolium* among the works of older authors, all of which point to the same plant.

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* Since writing the above, I have been informed by Dr. J. N. Rose that this species is exceedingly abundant throughout Central Mexico, where he is now collecting.

10. ACHILLEA LIGUSTICA All. Fl. Pedem. **1**: 181, *t. 52. f. 2.* 1785.

Plant robust and branching, pubescent or puberulent: leaves coarsely bipinnatifid, the rachis broadly margined: segments comparatively few, ovate or oblong in outline, irregularly incised: corymb rather slender, flat-topped: involucral bracts greenish, carinate: rays white, 2–3 mm. in diameter; achenes linear, wingless.

This plant must be added to our list of European waifs, two specimens having been collected at Onteora, N. Y., in 1891 by Miss Anna Murray Vail. The plant has also been collected on the Massachusetts coast.

In conclusion, I wish to express my grateful acknowledgements to Dr. N. L. Britton, Prof. L. M. Underwood and Dr. B. L. Robinson for the loan of material, and to Prof. Edward L. Greene for the privilege of using his invaluable library. To Mr. William R. Maxon, of the National Museum, I am also indebted for assistance in many critical comparisons and verifications.